PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 109846/CCS	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/NO2004/000235	International filing date *(day/month/year)* 04.08.2004	Priority date *(day/month/year)* 04.08.2003
International Patent Classification (IPC) or national classification and IPC F24B5/02, F23L9/02		
Applicant Hustad Johan Einar		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02.06.2005	01.11.2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Marianne Dickman / JA A Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NO2004/000235

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-6 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* 8 as amended (together with any statement) under Article 19
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-2 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NO2004/000235

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	2-4	YES
	Claims	1	NO
Inventive step (IS)	Claims	2-4	YES
	Claims	1	NO
Industrial applicability (IA)	Claims	1-4	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Additional document not cited in the International Search Report:

D1: GB 2274162 A

The claimed invention relates to an afterburner that can be installed in existing stoves lacking a supply of preheated secondary air above the primary combustion zone.

D1 reveals an afterburner device, whereby older stoves can be upgraded to be more environment friendly. The afterburner in D1 is in the form of a "deflector member (10)", defining the combustion chamber and corresponding to the vault (7) in the present application. When an old stove is to be upgraded, the old deflector (8) is replaced by the new deflector member (10) **installed on the rear wall**, and holes (24) are drilled in the stove for intake of secondary air (page 12 lines 1-9). The deflector member (10) is made up of a rectangular metal box having an internal pre-heating air chamber (11), two air inlets (12), and a lot of air outlets (13) provided in the lower face of the deflector member (10). External air enters the pre-heating air chamber (11) via the air-inlets (12) and is heated. Then, the air leaves the chamber (11) via the air outlets (13) to a zone below the deflector element, in the upper part of the combustion chamber, and above the stove's primary combustion zone.

The device in D1 solves the same problem as the claimed invention. The device stated in claim 1 differs from the device in D1 only in view of the wording: "...constituted by a

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

plate (1), that is folded...". However, this expression does not define an afterburner that is clearly different from the device in D1. It seems to be irrelevant if the pre-heater is manufactured by folding a plate, or by for example welding plates together to make up a functioning pre-heating chamber for the secondary air. Further, claim 1 does not reveal that the secondary air rises upwards in the pre-heater; this is defined in claim 2. Therefore, the subject matter of claim 1 is considered to lack novelty and inventive step.

Claim 2 defines an afterburner with a pre-heater mounted and designed so that secondary air rises upwards when it is pre-heated. In contrast to this, the afterburner previously known from D1 is mounted horizontally whereby the secondary air flows horizontally in the pre-heater and thereafter downwards, to the upper part of the combustion chamber. Thus, the subject matter of claim 2 is novel. Further, it is not considered obvious to a person skilled in the art to design and mount such a pre-heater for secondary air as is revealed in claim 2, in view of D1. Therefore, the subject matter of claim 2 is considered to involve an inventive step.

The subject matter of claims 3-4 also fulfils the requirements of novelty and inventive step, especially if the claims relate to claim 2.

There is no reason to doubt the industrial applicability of the invention.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 1 is unclear. The expression "...heated air to a zone (14) in the stove above the stove's combustion chamber (13)..." is unclear. The originally filed claim 1 says "...til et område (14) i ildstedet over ildstedets forbrenningssone (13...)". Thus, as the originally filed claim 1 indicates, the secondary air is supplied in the combustion chamber but in a zone above the primary combustion zone. The present claim 1 can be read to include a supply of secondary air above the vault (7).

Further, claim 1 does not reveal the cooperation of the "folded plate" and the "side or rear wall in an existing traditional stove" for building the chamber of the pre-heater.

PATENT COOPERATION TREATY 21 -07- 2005 20

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY AND AMENDMENTS OF CLAIMS

(PCT Rule 62 and Administrative Instructions, Section 417(d))

To:

Swedish Patent Office
P.O. Box 5055
S-102 42 Stockholm
Sweden

in its capacity as International Preliminary Examining Authority

Date of mailing (day/month/year)	
07 July 2005 (07.07.2005)	
International application No. PCT/NO2004/000235	International filing date (day/month/year) 04 August 2004 (04.08.2004)
Applicant HUSTAD, Johan, Einar	

The International Bureau hereby transmits a copy of the amendments to the claims under Article 19 together with any accompanying statement (Rule 62.1(ii)).

The International Bureau of WIPO
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AMENDED CLAIMS

[received by the International Bureau on 31 January 2005 (31.01.2005);
original claims 1 amended, remaining claims unchanged (1 pages)]

1. An afterburner device for stoves for burning wood or other types of biomass, coke or coal, supplying fresh, heated air to a zone (14) in the stove above the stove's combustion chamber (13),
characterised in that the device is constituted by a plate (1), that is folded and provided with holes (4, 6), wherein the plate is installed on the inside of a side or rear wall of an existing traditional stove constructed without aperture(s) for secondary air, and for cooperation with at least one secondary air aperture (2) arranged in said wall upon installation of the plate (1) in the already existing stove.

2. The afterburner device according to claim 1,
characterised in that the plate (1) has a number of holes or slits (4) near a folded end (16a) of the plate (1), the holes or slits (4) being arranged at the uppermost edge when installed, to allow air to get to the said zone (14), as at least one secondary air aperture (2) is arranged in a position just above a lower folded end (16b) of the plate (1) when it is installed; whereby air can be pre-heated while rising up behind the plate (1).

3. The afterburner device according to claim 1,
characterised in that the plate (1) is provided with holes (6) near a folded end (16b) of the plate (1) where the holes (6) are arranged towards the bottom edge when installed, to establish and maintain a pilot flame.

4. The afterburner device of claim 1,
characterised in that the plate (1) consists of two parts (15a, 15b) which can be mutually displaced to provide an adjustable dimension in a lateral direction when installed, for adaptation to stoves of different sizes.

STATEMENT UNDER ARTICLE 19 (1)

This is an amendment and statement under Article 19.

Enclosed please find amended claims wherein the apparatus of claim 1 is defined as "... constituted by a plate (1), that is folded and provided with holes (4, 6), wherein the plate is installed on the inside of a side or rear wall of an existing traditional stove constructed without aperture(s) for secondary air, and for cooperation with at least one secondary air aperture (2) arranged in said wall upon installation of the plate (1) in the already existing stove." (amendment underlined).

The Examiner states that the person skilled in the art, having the device known from D1 or D2 as a starting point, aiming to solve the identified problem, would with the knowledge of D3 be able to modify existing stoves just by later installing an afterburner device such as those described in D1 and D2, thus arriving at the invention according to claim 1.

We respectfully disagree with the Examiner and have the following comments:

D1 (NO 63947 A, S. D. Cappelen) relates to a storey stove that incorporates a system with secondary air for afterburning that in principle resembles the system of the present invention. D2 (EP 0464293 A1, Les Cheminees Philippe SA) resembles D1. There are many newer stoves that incorporate secondary air for afterburning as also described in the description of the present invention.

Most stoves in use today do not incorporate secondary air for afterburning, and it is the aim of the present invention to provide an afterburner that readily can be installed in existing stoves of this kind.

D3 (FR 2626063 A1, Lantz, Marcel) relates to a comparatively large stove and builds on the double chamber principle. This involves that air is let in to flow up along the walls of the stove from intakes underneath the stove vault, and mixed with the smoke from the primary chamber above the vault. The room between the plates where through the air flows, also acts as insulation against the outer walls of the stove. It is not unusual for plate ovens to have a double wall on the outside in order to keep the surface temperature of the stove down (this is regulated by fire regulations). A stove of this kind does not require for example ceramic insulating tiles on the inside, nor double walls on the outside. Stoves of this kind require at least two air supplies due to their size in order to distribute sufficient fresh air in the entire combustion vault. The air that cools the walls will to some extent be preheated, but is not mixed with the smoke after the smokes leaves the combustion chamber and is about to enter the pipe. In this area the temperature is much lower than in the combustion vault, especially at low loadings. This system does not work very well as an afterburner at low loadings when the problem of unburnt particles is the greatest. One of the purposes of the present invention is to mix fresh air with the smoke in the actual combustion chamber, thereby being effective at low loadings. At high loadings it is usually not necessary with an afterburner anyhow. The plates described in D3 can perhaps be dismantled, but they are not in any way made to be installed in another stove in order to reduce emissions. Their design and purpose is to cool the stove and they are used as an alternative to for example ceramic insulating tiles, not as an afterburning principle. Furthermore, it necessitates air intakes on the back above the ash tray, because it is not provided with air intakes of the kind that the present invention is provided with.

In light of these comments, it can not be seen that a combination of D1 or D2 and D3 results in a device according to the present invention. Furthermore, D1 dates back all the way to 1941 and the various afterburning principles mentioned in D2 and D3 where developed prior to 1990, but today, 15 years later, there does still not exist on the market any arrangement that can be installed in already existing traditional stoves in order to provide the afterburner function, especially at low loadings.